

Application No. 10/500,248
Filed: June 25, 2004
TC Art Unit: 3746
Confirmation No.: 8913

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A steerable nozzle for a rocket engine comprising: a casing surrounding a combustion chamber and having a rear end wall; a nozzle comprising a moving diverging portion and a static portion secured to the rear end wall; a jointed link device connecting the moving diverging portion of the nozzle to the static portion, the moving diverging portion and the static portion being in mutual contact via respective spherical surfaces; an actuator device acting on the moving diverging portion of the nozzle to enable the direction of the thrust vector of the engine to be varied by modifying the orientation of the nozzle with the spherical surfaces sliding one on the other; and

resilient return means interposed between the moving diverging portion of the nozzle and the static portion, said resilient return means acting on the moving diverging portion to urge it towards the static portion so as to keep the spherical surfaces in mutual contact for any desired orientation of the nozzle, to ensure gas tightness between the moving diverging portion and the static portion solely by the maintaining of the spherical surfaces in mutual contact for any desired orientation of the nozzle.

2. (Previously Presented) A nozzle according to claim 1, in which the link device is a cardan mount comprising a ring, two first link arms connecting the moving diverging portion of the nozzle to the ring via two first hinges, and two second link arms connecting the ring to the rear end wall of the casing via two

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second hinges wherein the resilient return means are integrated in link arms.

3. (Previously Presented) A nozzle according to claim 2, wherein the resilient return means are integrated in the first link arms.

4. (Previously Presented) A nozzle according to claim 1, wherein the resilient return means comprise prestressed springs.

5. (Previously Presented) A nozzle according to claim 1, wherein the resilient return means are constituted at least in part by an elastically deformable part of the link device which is elastically deformed on assembly.

6. (Previously Presented) A nozzle according to claim 2, wherein said resilient return means are constituted at least in part by said ring of the cardan mount which is elastically deformable and is elastically deformed on assembly.

7. (Previously Presented) A nozzle according to claim 1, wherein anti-friction means are provided between the spherical surfaces in mutual contact.

8. (Previously Presented) A nozzle according to claim 7, wherein the anti-friction means comprise a lubricant.

9. (Previously Presented) A nozzle according to claim 8, wherein the lubricant is a graphite grease.

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10. (Previously Presented) A nozzle according to claim 7, wherein the anti-friction means comprise a coating or an interface part in the zone of contact between the spherical surfaces.

11. (Previously Presented) A nozzle according to claim 1, in which the link device is a cardan mount having two pivot axes, and the actuator device comprises rotary actuators positioned on the cardan axes in order to steer said axes directly.

12. (Previously Presented) A steerable nozzle for a rocket engine comprising:

a casing surrounding a combustion chamber and having a rear end wall;

a nozzle comprising a moving diverging portion and a static portion secured to the rear end wall; a cardan mount connecting the moving diverging portion of the nozzle to the static portion, the moving diverging portion and the static portion being in mutual contact via respective spherical surfaces, the cardan mount comprising a ring, two first link arms connecting the moving diverging portion of the nozzle to the ring via two first hinges, and two second link arms connecting the ring to the rear end wall of the casing via two second hinges;

an actuator device acting on the moving diverging portion of the nozzle to enable the direction of the thrust vector of the engine to be varied by modifying the orientation of the nozzle with the spherical surfaces sliding one on the other; and

resilient return means integrated in link arms of said cardan mount and acting on the moving diverging portion to urge it

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towards the static portion so as to keep the spherical surfaces in mutual contact for any desired orientation of the nozzle, to ensure gas tightness between the moving diverging portion and the static portion solely by the maintaining of the spherical surfaces in mutual contact for any desired orientation of the nozzle.

13. (Currently Amended) A steerable nozzle for a rocket engine comprising:

a casing surrounding a combustion chamber and having a rear end wall;

a nozzle comprising a moving diverging portion and a static portion secured to the rear end wall;

a cardan mount connecting the moving diverging portion of the nozzle to the static portion, the moving diverging portion and the static portion being in mutual contact via respective spherical surfaces; and

an actuator device acting on the moving diverging portion of the nozzle to enable the direction of the thrust vector of the engine to be varied by modifying the orientation of the nozzle with the spherical surfaces sliding one on the other;

the cardan mount comprising a ring, said ring of the cardan mount being elastically deformed-deformable on assembly to act on the moving diverging portion to urge it towards the static portion so as to keep the spherical surfaces in mutual contact for any desired orientation of the nozzle, to ensure gas tightness between the moving diverging portion and the static portion solely by the maintaining of the spherical surfaces in mutual contact for any desired orientation of the nozzle.